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Pharmacy

U.S. Office of education

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THEOLOGICAL SEMINARY

PHARMACY[1]

By WALTER J. GREENLEAF

Occupational Information and Guidance Service

[Leaflet of a series on college counseling and advising for the professions; what the occupations are; what preliminary education is required; where professional training is offered; length of training; student budgets; and selected references. The series is designed for the use of high-school and college students, orientation classes, guidance committees, counselors, teachers, and parents.]

Pharmacy as a Career

PHARMACY, as generally practiced, may be defined as the science and art of preparing from crude vegetable, animal, and mineral substances and chemicals, materials in suitable and convenient form for use as drugs; the compounding of drugs; the dispensing of drugs and medicines according to prescription; and their distribution in other ways. For the purposes of the recently enacted Federal Food, Drug, and Cosmetic Act, "The term 'drug' means (1) articles recognized in the official United States Pharmacopoeia, official Homeopathic Pharmacopoeia of the United States, or official National Formulary, or any supplement to any of them; and (2) articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in man or other animals; and (3) articles (other than food) intended to affect the structure or any function of the body of man or other animals; and (4) articles intended for use as a component of any article specified in clause (1), (2), or (3), but does not include devices or their components, parts, or accessories."

As practiced in all of its branches, pharmacy also embraces the collection, identification, preservation, analysis, and standardization of drugs and medicines, the synthesis of medicinal chemicals; and the preparation of biological products. A knowledge of the physical, chemical, and biological sciences is, therefore, essential for the intelligent practice of pharmacy, and persons contemplating it as a career should elect, if possible, courses in physics, chemistry, botany, biology or zoology, and physiology, as a part of their high-school work.

Today pharmacy is recognized as a public health profession in every civilized nation of the world, and its practice in each is

[1] The American Pharmaceutical Association has given its approval of the material in this leaflet.

regulated by law. Its development as a public health profession in this country includes advances in pharmaceutical education and training; in the legal registration and licensing of pharmacists by the States; in legislation (1) for limiting the practice of pharmacy to those licensed, (2) for regulating the distribution of poisons, narcotics, and alcoholic liquors, and (3) for controlling the quality and purity of drugs and medicines; in the establishment of national and State agencies for the enforcement of such legislation for the protection of the public; and in the stimulation of research to develop new drugs and to improve standards.

The origin of pharmacy is lost in antiquity, but is identical with the beginnings of medicine. The word "pharmacy" is derived from the Greek word meaning "the use of a drug, potion, spell, or witchcraft," and the familiar ℞ (meaning "recipe"), which physicians still use to head their prescriptions, was originally an invocation to Jupiter. The Egyptians attributed the medicinal virtues of plants to spirits that dwelt within them, and prescriptions dispensed by the priests of Isis to the sick were accompanied by the chanter of incantations and spells. Astrologers of the Middle Ages believed that plants, animals, and minerals were under the influence of the planets and named them accordingly—lead was named "Saturn," iron, "Mars," etc. By slow degrees, sorcery lost the confidence of the people, and loathsome mixtures and concoctions of toads and vipers, such as described by Shakespeare in *Macbeth*, disappeared as a result of reason and research. When chemistry finally replaced alchemy, the art of compounding was separated from the art of prescribing, and mysticism was gradually relegated to obscurity with the introduction of pharmacopoeias.

Standards

The unification and standardization of drugs were early recognized by the physicians and pharmacists as being desirable, and the efforts to this end resulted in the issuing of *pharmacopoeias* and later of *formularies*. The early official pharmacopoeias were city and State publications which later became national in scope. One of the first of these was the Nuremberg Pharmacopoeia published in 1542. At the present time every civilized country has its national pharmacopoeia. In the United States the first pharmacopoeia to make its appearance was published in 1778—a 32-page leaflet for use in the Military Hospital of Washington's Army. The Pharmacopoeia of the United States of America, our national pharmacopoeia, was first issued in 1820. It has been revised every 10 years since, the eleventh revision being the official Pharmacopoeia of today. As the number of drugs increased, it became

necessary to limit the scope of the Pharmacopoeia. In 1886 the American Pharmaceutical Association issued the National Formulary, the Sixth Edition now being official, to provide standards for those drugs, especially preparations which could not be included in the Pharmacopoeia. As far as practicable, the Pharmacopoeia is limited to simples and the Formulary to preparations.

With the passage of the Pure Food and Drugs Act, which became operative June 30, 1906, the United States Pharmacopoeia and National Formulary became the legal standards for the enforcement of this law. The United States Pharmacopoeia and the National Formulary contain lists and descriptions of materials used in medicines with formulas, processes, tests for identity, purity, strength, etc., pertaining to the articles listed. They serve the purpose of standardizing drugs and preparations and thereby insure uniformity in the medicines dispensed by pharmacists.

Functions

Collegiate education and training is designed to prepare the pharmacist to conduct a pharmacy, to prepare, compound, distribute, and dispense drugs and medicines, including narcotics, poisons, and alcoholic liquors; to furnish sick-room supplies; to distribute insecticides and fungicides; to make analytical and microscopic examinations and prepare diagnostic reagents; to furnish health information and service; and to do these on sound economic principles.

The American drug store or pharmacy of today not only fills prescriptions and distributes drugs and medicines, but often maintains a soda fountain, a lunch counter, tobacco and candy counters, and frequently offers for sale many unrelated articles. Some critics hold that the occupation is overcommercialized, while others defend the addition of side lines as necessary in order that the pharmacist in small towns may be able to sustain himself, and in large cities to pay the high rents and overhead usually associated with a strategic location.

Qualifications

Among the qualifications which a pharmacist should possess are the following, which have been taken from The Commonwealth Fund Study:

The pharmacist must be a cultured man; he must possess professional morals and those psychological and ethical traits that have demonstrated their importance; he must be familiar with the commercial phases of pharmacy; he must be able to fill prescriptions accurately; he must understand what drugs should be manufactured and what drugs should be purchased;

he should be able to furnish information and materials for the control of insects, fungi, etc.; he must be competent to understand and use the United States Pharmacopoeia and the National Formulary; he must be able to disseminate information about public health and furnish first aid material and advice; he should know something about the nature of disease; he should have a wide range of miscellaneous scientific information outside of the college curriculum in pharmacy; he must be familiar with the Federal and State laws governing his profession; he must grow in information and skill after he graduates. His duties and functions are ever-changing and he must be active in his work in order to keep up to date. Some pharmacists must carry on research work. In all of these activities he should cooperate with physicians in the interest of public health.

The services the pharmacist renders are so important and the substances he handles so dangerous, that four traits of character and personality which should constantly control his actions are emphasized, namely, accuracy, honesty, dependability, and cleanliness. Those who do not possess and constantly develop these traits are not likely to succeed as pharmacists and may bring themselves into conflict with the many laws and regulations governing pharmacy.

Opportunities

About 90 percent of the graduates of colleges of pharmacy enter pharmacies and drug stores where they may become proprietors or managers, assistants, chemists, research workers, etc. Private ownership is profitable when the location is chosen with consideration for population, competition, etc., when dependable service is given, and business principles applied. Hospitals provide pharmaceutical departments in charge of pharmacists. Manufacturing pharmacists, manufacturing plants, and industrial laboratories employ pharmacists for control and research work involving medicines, drugs, cosmetics, vaccines, and similar products; the wholesale and manufacturing druggists employ trained men as representatives; publishers also have openings for experienced pharmacists, and many are engaged in pharmaceutical education.

The Federal Government employs pharmacists in the Army, the Navy, the Public Health Service, the Alcohol Administration, the Bureau of Narcotics, the Food and Drug Administration, the Veterans' Administration, and in other divisions.

The States employ pharmacists in the enforcement of the various laws regulating the profession and as pharmaceutical chemists and research workers.

The Personnel Classification Division, United States Civil Service Commission, places pharmacy in the professional and scientific service. As the educational requirements for entering the profession of pharmacy have increased, there has been a corresponding

recognition on the part of the Government of the professional qualifications of pharmacists.

Women in Pharmacy

Only 4 percent of the pharmacists are women. Often they hold positions in hospitals, laboratories, and in the various Government services. In drug stores they are usually employed as clerks, but seldom as managers or proprietors. In some colleges they serve as instructors. While there are few physical limitations for women in pharmacy, certain States ban night work for women in drug stores.

Salary

While salaries of pharmacists vary in different sections of the country, the State laws and regulations are often indicators: States with high requirements pay more, and States with low requirements pay less. A good estimate of the salary that a new graduate in pharmacy may expect once he becomes a registered pharmacist is about $30 per week, increasing to $60 to $65 per week. In chain stores a prescription pharmacist may earn $40 a week. The successful independent owner may net from $2,000 to $20,000 or more annually. There are no extensive salary studies for pharmacists.

National drug store survey.—The Department of Commerce began in March 1931, a study of representative drug stores in the St. Louis district which aimed to present a detailed analysis of their operations, so that a druggist may identify the sources of profit and loss. The commercial phases of this survey were presented in a series of publications by the Department of Commerce. The professional phases were published by the American Pharmaceutical Association in "Professional Pharmacy."

Census

The number of registered pharmacists in the United States is estimated to be at least 100,000, while the number of assistant registered pharmacists and drug clerks engaged in the actual preparation and distribution of drugs is estimated at 84,000.

The number of pharmacies or drug stores was 56,519 in 1935, of which number about 53,000 are independently owned, the remainder being chain stores. This is an average of one pharmacy for 2,200 population. The population ratio is lower in the cities.

The 1935 United States census provides very interesting data on the importation, manufacture, and distribution of drugs and medicines as well as other items sold in the drug store. Chain stores do about 18 percent of the total business. The average annual busi-

ness of a drug store amounted to about $21,704, including cosmetics, tobacco, fountain sales, etc., or about $9.75 per capita.

The Committee on the Costs of Medical Care reported that the people of the United States spent not less than $715,000,000 annually for drugs and medicines, or from $20 to $25 per family. Other items furnished in drug stores, including sick-room supplies, toilet articles and preparations, etc., equal or exceed the amount expended for drugs and medicines.

State Requirements

Four years of high-school training is the preliminary requirement for pharmacists in 47 States. (See table.) Where no mention of high-school training is made in the law, the requirement is automatic if college attendance or college graduation is required, as high-school graduation is a prerequisite for college entrance.

The professional requirement in 44 States is graduation from a college of pharmacy. In 3 States it is still possible to enter the profession with retail pharmacy experience only, and in 2 with 1 year of college attendance. Such States allow credit for time spent in a college of pharmacy.

In addition to college graduation, 39 States require also a certain amount of experience in retail pharmacy varying from 1 to 4 years. (See table.)

Registration

Every practicing licensed pharmacist and licensed assistant is registered in the State of practice; in a few States such registration is permanent, but is required annually in most States.

State Board Examinations

In order to practice pharmacy, an applicant must pass a licensing test before some State board of pharmacy. Both students and pharmacists should know about reciprocity between States and how it operates, in order to avoid complications which may arise in changing residence from one State to another. An applicant who desires to transfer must submit his credentials to the National Association of Boards of Pharmacy, where his record is checked as to his eligibility in the State to which he desires to transfer. If satisfactory, an official application blank is issued; the recipient board then acts on the case, but the issuance of an official blank does not guarantee registration in any State. New York and California are the only States that do not reciprocate through the National Association of Boards of Pharmacy. The basic rule for reciprocity is as follows: "The applicant must have had the legal qualifications at the time of examination and regis-

tration in the State from which he applies, which would *at that time* have enabled him to qualify for examination and registration in the State to which he is applying for reciprocal registration." For example, graduate pharmacists who are registered in Nevada or Massachusetts, where there are no college-training requirements, are not penalized because of their State's lack of this requirement, but are eligible for reciprocal registration in a State in which they *could have qualified* on the date of their original license for examination and registration; the basis for reciprocity is the personal qualification of the applicant rather than State requirements. For further information address the Secretary of the National Association of Boards of Pharmacy, 130 North Wells Street, Chicago, Ill.

Minimum State Requirements for the Practice of Pharmacy

State	Education required (years)			Additional years of experience required in retail pharmacy
	High school	College requirement	Year enacted	
1	2	3	4	5
Alabama	4	Graduation	1927	1
Arizona	4	.....do	1935	1
Arkansas	4	.....do	1930	1
California	4	.....do	1928	[1] 4
Colorado	4	.....do	1929	1
Connecticut	4	.....do	1925	1
Delaware	4	.....do	1927	2
District of Columbia	4	.....do	1928	1
Florida	4	.....do	1928	1
Georgia	4	.....do	1934	1
Idaho	4	.....do	1925	1
Illinois	4	.....do	1917	2
Indiana	4	.....do	1920	1
Iowa	4	.....do	1936	1
Kansas	4	.....do	1929	1
Kentucky	4	.....do	1924	2
Louisiana	4	.....do	1928	1
Maine	4	.....do	1931	1
Maryland	4	.....do	1920	1
Massachusetts	None	None	.....	[2] 4
Michigan	4	Graduation	1938	1
Minnesota	4	.....do	1929	1
Mississippi	4	.....do	1921	None
Missouri	4	.....do	1937	1
Montana	4	.....do	1926	1

[1] In lieu of experience credits, actual months of college attendance not to exceed 40 months.
[2] In lieu of experience credits, actual number of months of college attendance.

Minimum State Requirements for the Practice of Pharmacy—Continued

State	Education required (years)			Additional years of experience required in retail pharmacy
	High school	College requirement	Year enacted	
1	2	3	4	5
Nebraska	4	1 year	1930	[3] 3
Nevada	4	None	.....	5
New Hampshire	4	Graduation	1939	2
New Jersey	4	.....do	1920	[4] 4
New Mexico	4	.....do	1935	1
New York	4	.....do	1904	2
North Carolina	4	.....do	1922	1
North Dakota	4	.....do	1915	1
Ohio	4	.....do	1915	[5] None
Oklahoma	4	.....do	1923	2
Oregon	4	.....do	1922	1
Pennsylvania	4	.....do	1906	1
Rhode Island	4	.....do	1910	None
South Carolina	4	.....do	1933	1
South Dakota	4	.....do	1931	1
Tennessee	4	1 year	1938	[6] 4
Texas	4	Graduation	1934	1
Utah	4	.....do	1927	1
Vermont	4	None	.....	4
Virginia	4	Graduation	1922	None
Washington	4	.....do	1914	None
West Virginia	4	.....do	1923	2
Wisconsin	4	.....do	1927	1
Wyoming	4	.....do	1933	1
Outlying parts of the United States				
Alaska	2	None	.....	5
Hawaii	4	Graduation	.....	[2] 4
Philippine Islands	4	.....do	.....	3
Puerto Rico	4	.....do	1927	None

[3] In lieu of experience credits, full calendar year for each year of college attendance.
[4] In lieu of experience credits, actual number of months of college not to exceed 36 months; 1 full year of experience must be subsequent to graduation from college, in a pharmacy approved for that purpose.
[5] Only if *all* time is spent in pharmacy school.
[6] In lieu of experience credits, actual months of college attendance not to exceed 2 years.

The Schools and Colleges

The first college of pharmacy was established in Philadelphia in 1821. In 1899 there were 52 schools and colleges with 3,563 students. The entrance requirements included the completion of the eighth grade. In 1920 the entrance requirements were raised to 2 years of high school, and in 1923 to 4 years of high school. The American Association of Colleges of Pharmacy required its members to extend their courses to 3 years in 1925 and to 4 years in 1932.

Sixty-nine schools and colleges now offer courses in pharmacy leading to a degree and all but 2 had women students in 1938. Fifty-nine of these schools hold membership in the American Association of Colleges of Pharmacy, which is a member of the American Council on Education.

The American Council of Pharmaceutical Education, composed of representatives from the American Pharmaceutical Association,[2] the American Association of Colleges of Pharmacy, and the National Association of Boards of Pharmacy, with an advisory representative from the American Council on Education, was organized to establish standards for pharmaceutical education and registration and to approve teaching institutions, and is expected to issue a list of approved institutions in the fall of 1939.

Admission requirements.—Colleges of pharmacy require "evidence of the satisfactory completion of 4 years of high-school work or its equivalent" (constitution of the A. A. C. P.). These admission requirements vary somewhat with different colleges, but in general, the requirements are: English (4 years), 3 units; history or social science, 1; algebra, 1; plane geometry, 1; science, with laboratory work, 1; 3 additional units to be selected from English, languages other than English, mathematics, science, history, and the social sciences; also 5 additional units from other subjects offered for graduation in secondary schools, which subjects are variously restricted by different colleges.

Curriculum in pharmacy.—Since 1932, the curriculum has required for graduation not less than 3,200 hours of instruction, including at least 1,300 hours of lectures and recitations and at least 1,300 hours of laboratory work, to be given within a period of not less than 4 full college years of at least 32 weeks each, with a minimum 5-day week. At least 2 months must elapse between each college year. Institutions conducting a regularly organized summer session may, with the consent of the executive committee, shorten the time in years if all required hours are completed.

The Committee on Curriculum and Teaching Methods of the American Association of Colleges of Pharmacy suggest for the first year's work, general chemistry, botany, English, modern languages, mathematics, and pharmacy; for the second year's work, qualitative analysis, physics, biology (including physiology), histology, and pharmacy; for the third and fourth years' work, quantitative analysis, organic chemistry, bio-chemistry, pharmacy, pharmacognosy, materia medica, pharmacology, bacteriology, and electives. The foregoing is suggestive only, each institution will vary its program to meet special needs.

[2] See page 19.

In 1911 the American Pharmaceutical Association, the National Association of Boards of Pharmacy, and the American Association of Colleges of Pharmacy established a joint standing committee, composed of seven members from each organization, to prepare and revise a Pharmaceutical Syllabus specifying subjects which in their judgment should be included in the minimum curriculum, the scope of such subjects, and the time to be devoted to each. The effect of this work has been to bring about greater uniformity in the education and registration of pharmacists. The committee issued the fourth edition of the Syllabus covering the 4-year course, in 1932, and has adopted the policy of keeping its work up-to-date by frequent revisions.

Practical experience is required, in addition to college training, by most States. (See table, p. 7.) An examination of this table will reveal the fact that as a result of the increased practical training provided in the 4-year course, the practical experience requirement has been reduced to 1 year in most instances.

Degrees

The bachelor of science in pharmacy (B. S. in Pharmacy) is generally awarded upon the completion of not less than 3,200 hours of college work, and indicates that the student has had 4 years of professional training with pharmacy as the major subject. Master of science in pharmacy or master of science without designation is a graduate degree which requires at least 1 year of study beyond the first degree. Doctor of Science (D. Sc.) and Doctor of Philosophy (Ph. D.) with a major in pharmacy are graduate degrees offered in several institutions as listed in the table.

Student Expenses, 1938

The total expense of 1 year's work at a pharmacy school may be kept within $650 by an economical student. To this figure he must add whatever he expects to spend for travel, clothing, amusements, clubs, and other items which depend on individual needs.

The average nonresident tuition fee in the 69 schools of pharmacy is $239 per college year of 9 months. (See column 3 of the following table.) The publicly controlled schools, which include municipal colleges and State universities, charge small tuition fees for students who live in the city or State in which the college is located, but nonresidents pay more for the same instruction; 11 of these public institutions charge less than $100 per year to State residents. (See column 2 of the following table.) Total fees in colleges charging the highest tuition range from $290 to $450 per year.

The average for board and room as reported by 67 colleges is $298 for 9 months. Colleges located in small towns usually provide cheaper rates than institutions in larger cities where the cost of living is materially higher. The cost of books averages $26 in 69 colleges. Laundry may be figured at $1 per week or $36 for the college year.

Incidentals must be limited to $75 if the expense is to be kept within $650. The accompanying table gives the variations in expenses at the several institutions. Comparisons of expenses with the averages indicated below will assist a student to make up his tentative budget for the first year.

Estimated nonresident student budget for 1 year

Tuition and fees	$239
Board and room	298
Books	26
Laundry	36
Incidentals	51
Total	$650

Schools of Pharmacy, 1938

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
Alabama										
*Alabama Polytechnic Institute, School of Chemistry and Pharmacy, Auburn	$87	$137	$275	$25	55	2	11	4	5 1/3	....
Howard College, School of Pharmacy, Birmingham	200	200	180	15	91	4	4	4	....	....
California										
University of California, College of Pharmacy, San Francisco	275	295	360	25	196	20	20	4	....	....
*University of Southern California, College of Pharmacy, Los Angeles	302	302	320	35	129	14	28	4	5	....

*The asertisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
Colorado										
*University of Colorado, College of Pharmacy, Boulder.	$130	$196	$300	$30	99	16	14	4	....	....
Connecticut										
*Connecticut College of Pharmacy, New Haven.....	300	300	360	20	151	15	17	4	....	....
District of Columbia										
*George Washington University, School of Pharmacy, Washington.....	275	275	360	12	58	1	7	4	....	....
*Howard University, College of Pharmacy, Washington..	175	175	270	25	26	2	3	4	....	....
Florida										
*University of Florida, School of Pharmacy, Gainesville.....	60	160	265	40	[1] 85	7	11	4	5	7
Georgia										
*University of Georgia, School of Pharmacy, Athens.....	173	273	180	40	50	7	6	4	....	....
Southern College of Pharmacy, Atlanta.	175	175	300	20	40	4	14	....	....	....
Idaho										
*University of Idaho, Southern Branch, College of Pharmacy, Pocatello....	68	128	237	15	128	12	26	4	....	....
Illinois										
*University of Illinois, College of Pharmacy, Chicago.....	162	212	360	35	208	21	45	4	....	....

[1] Freshman are not included in this figure; they are enrolled in General College.

* The asterisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
Indiana										
*Indianapolis College of Pharmacy, Indianapolis	$240	$240	$300	$10	190	10	40	4	....	....
*Purdue University, School of Pharmacy, Lafayette	130	230	400	20	136	24	34	4	5	7
*Valparaiso University, College of Pharmacy, Valparaiso	193	193	225	30	38	5	16	4	....	....
Iowa										
Des Moines University, College of Pharmacy, Des Moines	210	210	216	20	55	3	9	4	....	....
*State University of Iowa, College of Pharmacy, Iowa City	118	158	252	14	87	14	31	4	5	....
Kansas										
*University of Kansas, School of Pharmacy, Lawrence	87	207	289	30	92	13	15	4	5	....
Kentucky										
*Louisville College of Pharmacy, Louisville	200	200	360	40	92	2	19	4	....	....
Louisiana										
*Loyola University, New Orleans College of Pharmacy, New Orleans	210	210	360	20	37	12	13	4	....	....
*Xavier University, College of Pharmacy, New Orleans	165	165	144	25	23	5	5	4	....	....
Maryland										
*University of Maryland, School of Pharmacy, Baltimore	175	300	350	30	167	14	49	4	5	6+

* The asterisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
Massachusetts										
*Massachusetts College of Pharmacy, Boston	$250	$250	$365	$27	309	27	52	[1] 4	....	....
Michigan										
*Wayne University, College of Pharmacy, Detroit	123	198	360	20	131	22	7	4	5	....
*Detroit Institute of Technology, College of Pharmacy and Chemistry, Detroit	185	185	400	20	112	.....	13	4	....	....
*University of Michigan, College of Pharmacy, Ann Arbor	125	165	300	40	62	15	20	4	5	7
*Ferris Institute, College of Pharmacy, Big Rapids	180	180	234	27	66	12	8	4	....	....
Minnesota										
*University of Minnesota, College of Pharmacy, Minneapolis	123	168	315	35	138	20	41	4	5	7
Mississippi										
*University of Mississippi, School of Pharmacy, University P. O	171	221	140	25	38	5	6	4	5	....
Missouri										
The Kansas City College of Pharmacy, Kansas City	245	245	.....	20	87	.....	18	4	5	....
*St. Louis College of Pharmacy, St. Louis	228	228	250	25	109	9	16	4	....	....

[1] This institution also offers the degree of Ph. C. in 5 years.

*The asterisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
Montana										
*State University of Montana, School of Pharmacy, Missoula	$109	$184	$340	$20	63	24	15	4	5	....
Nebraska										
*Creighton University, College of Pharmacy, Omaha	225	225	360	20	68	10	16	4	....	....
*University of Nebraska, College of Pharmacy, Lincoln	106	156	300	25	102	10	16	4	5	....
New Jersey										
*Rutgers University, New Jersey College of Pharmacy, Newark	343	443	360	35	203	16	32	4	....	....
New York										
*Columbia University, College of pharmacy, New York	430	430	450	20	275	18	97	4	....	6
*Fordham University, College of Pharmacy, New York	450	450	.....	25	146	1	38	4	....	....
*Long Island University, Brooklyn College of Pharmacy, Brooklyn	375	375	360	20	300	8	74	[3] 4	....	....
Union University, Albany College of Pharmacy, Albany	413	413	320	32	98	8	32	[4] 4	....	....
*University of Buffalo, College of Pharmacy, Buffalo	430	430	250	20	93	14	25	4	5	....
St. John's University, College of Pharmacy, Brooklyn	385	385	360	20	227	26	76	4	5	6

[3] This institution also offers the degree of Ph. G. in 3 years.

[4] This institution also offers the degree of Ph.G. in 3 years. However, 1938–39 is the last year in which this degree will be offered. They also offer the degree of Ph. C. in 3 years. 1938–39 is the last year for this degree also.

*The asterisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
North Carolina										
*University of North Carolina, School of Pharmacy, Chapel Hill	$183	$283	$300	$25	108	19	22	4	5	....
NORTH DAKOTA										
*North Dakota Agricultural College, Division of Pharmacy, Fargo	53	108	220	30	89	10	14	4	....	....
Ohio										
Cincinnati College of Pharmacy, Cincinnati	250	250	320	15	164	8	38	4	....	....
*Ohio Northern University, College of Pharmacy, Ada	207	207	207	25	84	12	20	4	....	....
*Ohio State University, College of Pharmacy, Columbus	104	254	270	25	219	24	39	4	....	....
University of Toledo, College of Pharmacy, Toledo	130	180	300	35	48	12	8	[5] 4	....	....
*Western Reserve University, School of Pharmacy, Cleveland	321	321	375	16	88	13	24	4	5	7
Oklahoma										
*University of Oklahoma, School of Pharmacy, Norman	80	180	270	25	16	2	18	4	5	....

[5] This institution offers the degree of B. Ph. in 4 years, but it is given only to those registered previous to September 1937.

* The asterisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
Oregon										
*North Pacific College of Oregon, School of Pharmacy, Portland	$183	$183	$270	$30	35	4	10	4	....	....
*Oregon State College, School of Pharmacy, Corvallis	80	200	245	35	96	18	20	4	5	....
Pennsylvania										
*Duquesne University, School of Pharmacy, Pittsburgh	290	290	360	15	85	12	.....	4	....	....
*Philadelphia College of Pharmacy and Science, Philadelphia	322	322	450	35	250	17	70	4	[6] 5	....
*Temple University, School of Pharmacy, Philadelphia	275	275	340	40	148	20	24	4	5	....
*University of Pittsburgh, College of Pharmacy, Pittsburgh	315	315	425	30	163	23	41	4	....	....
Philippine Islands										
*University of the Philippines, College of Pharmacy, Manila	85	85	112	25	18	259	38	4	5+	....
Puerto Rico										
*University of Puerto Rico, College of Pharmacy, Rio Piedras	125	.....	270	40	67	48	16	4	....	....
Rhode Island										
*Rhode Island College of Pharmacy and Allied Sciences, Providence	275	275	360	32	72	12	18	4	....	....

[6] This institution offers the degree of D. Sc. in 7 years.

* The asterisk indicates that the institution is a member of the American Association of Colleges of Pharmacy.

Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
South Carolina										
Medical College of the State of South Carolina, School of Pharmacy, Charleston...	$107	$197	$270	$25	24	.....	10	4	....	....
*University of South Carolina, School of Pharmacy, Columbia.....	135	225	220	20	74	2	7	4	....	....
South Dakota										
*South Dakota State College, Division of Pharmacy, Brookings.....	114	149	225	30	73	8	15	4	5	....
Tennessee										
*University of Tennessee, School of Pharmacy, Memphis.....	145	235	225	45	90	5	9	[7] 4	....	....
Texas										
*University of Texas, College of Pharmacy, Austin.....	75	225	300	25	220	24	39	4	....	....
Virginia										
*Medical College of Virginia, School of Pharmacy, Richmond.....	229	229	280	20	114	15	21	4	....	....
Washington										
*State College of Washington, School of Pharmacy, Pullman.	75	205	272	35	90	30	22	4	5	....
*University of Washington, College of Pharmacy, Seattle..	97	202	315	50	175	40	44	4	5	7

[7] This institution offers the degree of Bachelor of Pharmacy in 4 years.

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Schools of Pharmacy, 1938—Continued

Institution and Location	Average yearly expense				Enrollments 1937–38		Number of degrees awarded, 1938	Degrees offered and years required		
	Tuition and fees		Board and room	Books	Men	Women		B. S. in Phar.	M. S.	Ph. D. in Phar.
	State residents	Nonstate residents								
1	2	3	4	5	6	7	8	9	10	11
West Virginia										
*West Virginia University, College of Pharmacy, Morgantown	$144	$294	$300	$25	39	7	7	4	....	....
Wisconsin										
*University of Wisconsin, Course in Pharmacy, Madison.	60	260	375	20	90	25	30	4	5	7
Averages (schools reporting figures)	$126	$239	$298	$26	.....	.....	.....	....	....	....
Total (69 schools)	.....	.....	.....	....	7,548	1,126	1,663	....	....	....

Professional Organizations

The A. A. C. P.—American Association of Colleges of Pharmacy (formerly the American Conference of Pharmaceutical Faculties), established to promote the interests of pharmaceutical education and research, admits to membership colleges of pharmacy which maintain certain minimum standards, are not conducted for gain, and have been operating for at least 5 years. Beginning with the session of 1932 such colleges have required a minimum 4-year course of 3,200 hours of instruction for graduation of which at least 1,300 hours are lectures and recitations, and at least 1,300 are devoted to laboratory work. (See proceedings of the A. A. C. P., 1935.)

A. Ph. A.—American Pharmaceutical Association, 2215 Constitution Ave., Washington, D. C., was established in 1852 to improve and regulate the drug market, to improve the science and art of pharmacy, to regulate the system of apprenticeship and employment, and to create and maintain a standard of professional honesty. Active membership is about 4,000. The State pharma-

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ceutical associations are affiliated with it and have a combined membership of about 40,000.

N. A. B. P.—National Association of Boards of Pharmacy, 130 North Wells Street, Chicago, Ill., was organized in 1904 to promote closer relationship among boards of pharmacy; to provide for interstate reciprocity in pharmaceutic licensure based upon a uniform minimum standard of education and legislation; and to improve the standards of pharmaceutical education and licensure by cooperating with State, national, and international agencies and associations having similar objectives.

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